

R&D QUARTERLY STATUS REPORT

REPORTING PERIOD: 15 April 1995 THROUGH 15 July 1995

Sponsored by:

Advanced Research Projects Agency (ARPA)
Contract Management Office (CMO)
Liquefied Metal Jet Program (LMJP)

ARPA Order No. 9328/03

Issued by: ARPA/CMO

Under Contract No.: MDA972-93-C-0035

Deliverable Item Sequence No.: 0002AA

"The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressly or implied, of the Advanced Research Projects Agency or the U.S. Government."

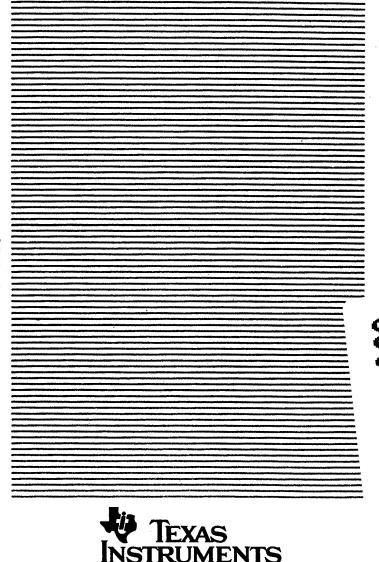
Distribution Statement:

Approved for Public Release Distribution Unlimited

Prepared by:

Texas Instruments
Defense Systems & Electronics Group
13500 North Central Expressway
Dallas, Texas 75243

07 July, 1995



LIQUIFIED METAL JET PROGRAM (LMJP)

AUTOMATION AND ROBOTICS RESEARCH INSTITUTE (ARRI)

R&D QUARTERLY STATUS REPORT DATA ITEM 0002AA

15 APRIL 1995 THROUGH 15 JULY 1995

1.0 INTRODUCTION

This report covers the period from 15 April 1995 through 15 July 1995. The Quarterly Technical Reports are organized by the statement of work (SOW) listed in section 5.0 of the proposal. These are listed as follows:

- Reports and demonstration.
- Equipment.
- System test and experimentation.
- Test coupon evaluation.
- Technology transfer.

A new jeweled orifice plate supplier has been located and orifices have been successfully procured and tested. The nozzle sealing problem has also been resolved and over 50 nozzles have been assembled with no leaks. The remaining problem to be solved is believed to be casued by particulates in the solder. Improved filtering methods have been developed and are currently in test. System testing with the new nozzle design and micro filtered solder is expected to resume operations in mid July. Final fabrication and assembly of the copper system is expected to be complete by mid August.

2.0 PROGRESS DURING THE REPORTING PERIOD

- Identified and incorporated improvements for nolead system reliability including a
 nozzle redesign, new orifice vendor, and assembling nozzles in house.
- Identified and designed several methods of filtering solder for evaluation
- Completed design and started fabrication of copper system.
- Began assembly of copper system fluidizer pressure vessel.
- Resolved XY table issues with custom designed and fabricated hardware/software.
 This eliminated the need of purchasing a new table and thus saving the project of at least \$20,000.
- Completed design and order placement for copper system fluidizer containment vessel and silicon carbide heater elements.

Improvements on miniaturization of the deflection system were completed and successfully tested.

3.0 PLANNED ACTIVITIES FOR NEXT REPORTING PERIOD

- Demonstrate resolution of particulate problem
- Demonstrate PWB fabrication capability
- Produce solder coupons for evaluation
- Demonstrate proper copper droplet formation

4.0 EQUIPMENT PURCHASE OR CONSTRUCTED

Assembled/Constructed:

- Completed nolead system modifications to reduce intermetallic contamination.
- Constructed filtration system to filter particulates from solder.
- Began manufacturing copper system.
- Constructed and tested 16 new nozzle assemblies

Purchased:

None

5.0 NOTIFICATION OF KEY PERSONNEL CHANGES None

6.0 INFORMATION FROM TRIPS, MEETINGS, AND SPECIAL CONFERENCES

Meetings with MicroFab to discuss future cooperative efforts. Attended NEPCON 95

conference in Anaheim, Ca. Held program review of this project at ARPA offices in

Washington D.C.

REPORT DOCUMENTATION PAGE

Form Approved QMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services. Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

VY LLEGE 4002, and to the Chice of Walla	gement and budget, Paperwort	neduction Project (0704-0	188), washington, DC 20503.	
Agency Use Only (Leave Blank)	2. Report Date July 07, 1992	Report Type and Dat Qarterly Status Report	es Covered	
4. Title and Subtitle			unding Numbers	
R & D Quarterly Status Report		101	DA 070 00 0 000F	
6. Author(s) Mr. Nick Dringenburg, Dr. Charles Smith, Mr. Patrick DuBols,			DA972-93-C-0035	
Mr. R.E. Terrill, and Dr. Joh]		
7. Performing Organization Name(s) and Address(es)				
Automation Robotic Research institute	Texas Instruments Inc		erforming Organization Report Number	
7300 Jack Newell Blvd. South	P.O. Box 655012		2AA	
Ft. Worth, TX 76118-7115	Dallas, TX 75265			
Sponsoring/Monitoring Agency Name(s) and Address(es)			Sponsoring/Monitoring Agency	
Advanced Research Projects Agency (ARPA)			Report Number	
Contract Management Office (CMO)			ARPA Order Number 9328/03	
Virginia Square Plaza 3701 North Fairfax Drive				
Arlington, VA 22203-1714				
11. Supplementary Notes				
12a. Distribution/Avaliability Statement Approved for Public Release; Distribution Unlimited			12b. Distribution Code	
13. Abstract (Maximum 200 words)				
This report covers the period from 15 April 1995 through 15 July 1995. Substantial progress was made this quarter. The nozzle and nozzle sealing problems were resolved. The x-y table was modified to improve its performance.				
		Dire q	UALITY INSPECTED ≿	
14. Subject Terms		15. 1	Number of Pages	
Liquefled Metal Jet (LMJ)			2	
		16. 1	Price Code	
17. Security Classification of Report	19 County Classification 4:	la Barra III da a		
UNCLASSIFIED	18. Security Classification of t UNCLASSIFIED	of Abstraction UNCLASSIFII		